

**Two new species of seven-spined *Bathyconchoecia* from the
North Atlantic and Indian oceans
(Crustacea: Ostracoda: Halocypridae)**

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Abstract.—A new species of halocyprid ostracode *Bathyconchoecia omega* from abyssal depths of the North Atlantic Ocean, off Newfoundland, Canada, is described and illustrated, and a new species *Bathyconchoecia georgei* is proposed for a specimen from the Indian Ocean previously referred to *Bathyconchoecia deeveyae* Kornicker, 1969.

The R/V *Chain*, operated by the Woods Hole Oceanographic Institution, collected in 1972 at a depth of 4400 m in the North Atlantic Ocean, off Newfoundland, Canada, a bottom sample containing a single A-1 male of *Bathyconchoecia omega*, new species. The A-1 male from off Newfoundland is considerably larger than previously described seven-spined species of the genus, and is the northernmost occurrence of the group. Additional ostracodes in the sample are mostly bottom-living Podocopida, Cladocopida and Myodocopida, which suggests a bottom or near-bottom habitat for *B. omega*. However, a specimen of pelagic species of *Conchoecia* in the sample suggests that it contains some shallow water contaminants.

Only three species of *Bathyconchoecia* having seven spines on the carapace (four on right valve, three on left), have been described previously: *B. deeveyae* Kornicker, 1969, *B. septemspinosa* Angel, 1970, and *B. longispinata* Ellis, 1987. One of the specimens previously referred to *B. deeveyae* is proposed as a new species herein. Thus, the number of 7-spined species of *Bathyconchoecia* is now five. Their distribution is shown in Fig. 1.

Correction.—Kornicker (1981:1237) reported that the slide containing the appendages of the holotype of *B. deeveyae* (USNM 123335) had been lost. It has been recovered.

***Bathyconchoecia omega*, new species
Figures 2–6**

Holotype.—Unique specimen, A-1 male on slide and in alcohol, MCZ Harvard University, MCZ50432.

Type locality.—R/V *Chain* 106, 30 Aug 1972, Station 334, North Atlantic Ocean, off Newfoundland, Canada, 40°42.6'N–40°44'N, 46°13.8'W–46°14.6'W, epibenthic sled, depth 4400 m.

Material.—Holotype.

Description of A-1 male (Figs. 2–6).—Carapace with linear dorsal margin except for slight bulge near middle just posterior to base of dorsal spine. Posterodorsal corner of each valve with gland on very slight bulge. Posterodorsal corner evenly rounded except for long spine on right valve; spine parallel with length of valve, but at slight upward angle (very tip of spine of specimen broken off; soft matter projects from broken tip). Base of spine projects slightly medial

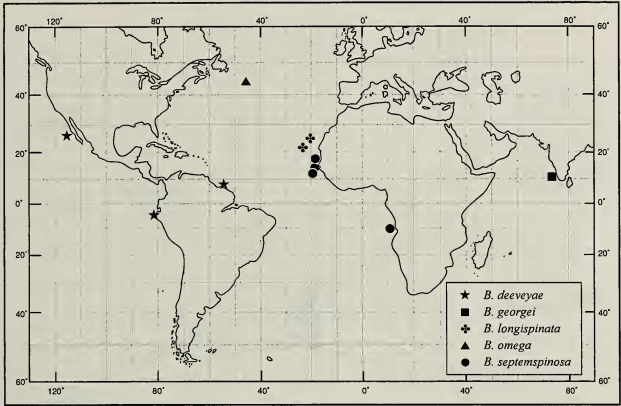


Fig. 1. Distribution of species of seven-spined *Bathyconchoecia*.

to slightly overlap posterior edge of left valve (Fig. 2B). Rostrum of each valve with anterior spine at slight angle to each other (Fig. 2B). Spine at midlength of dorsal margin of each valve at slight outward and upward angle (Fig. 2A, B). Spine near ventral margin of each valve at about $\frac{2}{3}$ length of valve at slight downward and outward angle. Anterior spines on rostra and posterior spine on right valve with surface ridges parallel to lengths of valves; a few of the ridges of the rostral spines bear short stout spines. Other long spines with minute surface spines. Carapaces completely covered by distinct punctae and slightly curved vertical frills (not all shown in Fig. 2A). Frills generally on each side of 2 or 3 rows of punctae (Fig. 2C). Indistinct reticulations and ridges on anteroventral surface of valve ventral to incisure (Fig. 2A).

Pigmentation: No black pigment spots on either carapace or body.

Central adductor muscle attachments (Fig 2A): Indistinct, near center of valve

and consisting of 2 individual scars; striations of muscle ends indistinctly visible from outside view of valve; scars not covered by punctae.

Carapace size (mm): Length including spines 3.79, length excluding spines 2.92, height excluding spines 1.68, width without spines 1.52.

First antenna (Fig. 2E): Shaft short with indistinct segmentation. Brush-like structure with about 315 filaments in about 9 rows, each with about 35 filaments. Dorsal bristle on segment following brush-like structure stout, spinous, about $\frac{2}{3}$ length of brush filaments. Terminal segment with 4 bristles: 1 long stout bristle reaching well past brush filaments and with widely scattered marginal spines (not shown); 3 shorter than brush filaments. Limb with densely packed amber-colored cells.

Second antenna (Fig. 3A–D): Protopod bare. Endopod: 1st article with 2 spinous dorsal bristles (1 long, 1 short) and few indistinct medial spines near ventral margin;

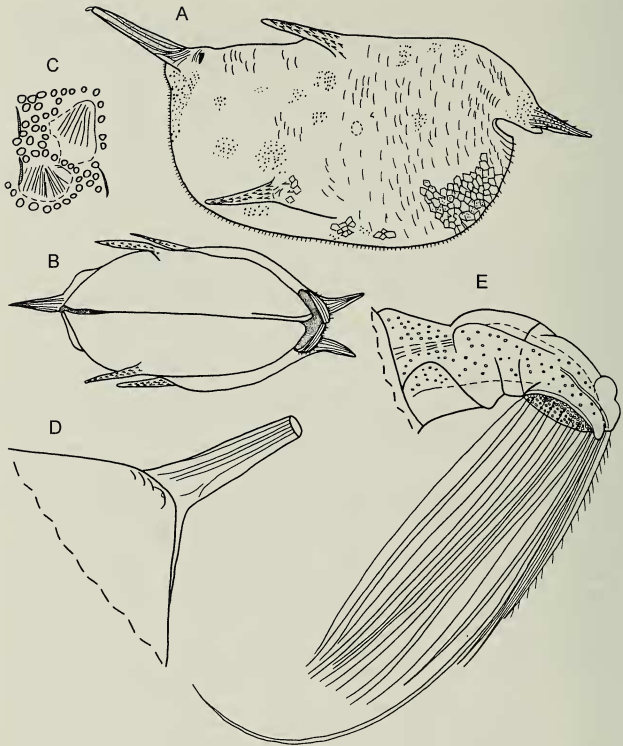


Fig. 2. *Bathyonchoecia omega* holotype, MCZ 50432, A-1 male: A, Complete carapace from right side, length without spines 2.92 mm; B, Complete carapace, ventral view; C, Left valve, detail of ornamentation on outer surface; D, Posterodorsal corner of complete specimen (spine on right valve, glandular opening on left valve); E, Right 1st antenna, lateral view.

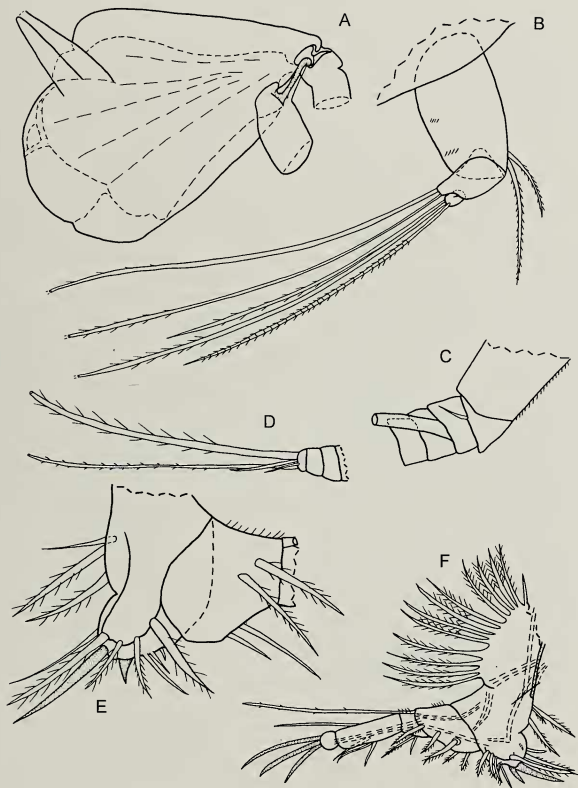


Fig. 3. *Bathyconchoecia omega* holotype, MCZ 50432, A-1 male; A, Left 2nd antenna, medial view; B, Endopod right 2nd antenna, lateral view; C, Proximal part exopod left 2nd antenna, medial view; D, Distal part exopod right 2nd antenna, lateral view; E, Proximal part left 5th limb, lateral view; F, Right 5th limb drawn on body, lateral view.

2nd article with 1 minute bristle medial to 3rd article and 2 stout terminal bristles with few indistinct marginal spines (inner bristle stouter, both about same length as exopod bristles); 3rd article with 3 bristles: middle bristle longer and stouter than others, more than 1/2 length of bristles of 2nd article, with few marginal spines; outer bristle about 1/2 length of middle bristle, with many marginal spines; inner bristle similar in length to outer bristle, with marginal spines; base of 3rd article lateral to distal end of 2nd article; endopods of left and right limbs similar. Exopod: 1st article with short ventral spines and small medial terminal bristle; articles 2 to 8 with long natatory bristle; 9th article with 4 bristles (2 short lateral; 1 ventral of medium length and with short marginal spines; 1 long dorsal, with natatory hairs).

Mandible (Fig. 4): Coxa (Fig. 4B–E): Pars incisivus with 5 ventral teeth and slender distal tooth at ventral tip of triangular posterior section; anterior edge serrate (Fig. 4C). Proximal list with 10 teeth in 2 layers (Fig. 4D); distal list with 19 teeth in 3 layers (Fig. 4E). Spined posterior part with 6 lobes with numerous spines and 7th lobe with short stout spinous bristle and minute spines along distal posterior edge of lobe near bristle (Fig. 4C). Anterior margin of coxa evenly rounded, without triangular process. Basis (Fig. 4A, F, G): 2 long plumose bristles present on or near dorsal margin and 1 long spinous medial bristle near midwidth some distance from dorsal margin (Fig. 4F); lateral surface with 3 long bare distal bristles and long spines (Fig. 4F); posterior margin spinous and with 2 short distal bristles (proximal bristle sclerotized and with ventral spines; distal bristle tube-formed) (Fig. 4G); anterior margin with long bare distal bristle (Fig. 4G); ventral margin with 5 short teeth with minute secondary teeth (Fig. 4G); 1 short tooth with minute secondary teeth on posterior margin proximal to posterior ventral tooth. Posterodorsal corner of basis with oval sclerite (Fig. 4A, B). Endopod (Fig. 4F, H): Article

1 with dorsal, ventral, lateral, and medial slender spines and 4 bristles (1 long, terminal, dorsal, spinous; 1 long, distal, ventral, bare; 2 medium length, medial with bases close to ventral bristle, bare). Article 2 with 5 bristles (2 long and 1 shorter, terminal, dorsal, spinous; 2 medium length, distal ventral, bare) and few distal spines on ventral margin and medial and lateral surfaces near ventral margin. Article 3 with long spinous terminal claw and 6 bristles (2 long, spinous, terminal (shorter of these with base on medial side), and 4 short, ventral, bare (1 of these with lateral base)) and medial spines.

Maxilla (Fig. 5A–C): Endite of precoxa with 2 tube-formed bristles, 3 claws, and 2 long spinous bristles. Coxa: dorsal margin with long stout dorsal bristle (Fig. 5B); proximal endite with 3 tube-formed bristles and total of 4 claws and claw-like bristles; distal endite with 2 tube-formed bristles and 4 claws. Basis with 2 long stout plumose bristles near dorsal margin, and short bare ventral bristle. Endopod: article 1 spinous with 4 dorsal bristles (3 proximal, 1 distal); medial surface with 4 distal bristles (3 long, 1 short); article 2 with 2 stout claws of unequal length and 4 slender bristles.

Fifth limb (Fig. 3E, F): Epipod with 3 groups of 4 stout plumose bristles; dorsal group with additional small 5th bristle (Fig. 3F). Precoxa with 3 ventral bristles (Fig. 3E). Coxa with 11 or 12 ventral bristles (not all shown). Basis with 6 bristles plus long terminal dorsal exopod bristle with minute widely separated marginal spines (not all shown). Endopod: article 1 with dorsal and medial spines and 3 bristles (not all shown). Article 2 with dorsal and medial spines and 4 bristles (3 near ventral margin and 1 longer dorsal). Article 3 with 2 long terminal slender claws and 1 long ringed, terminal, slender ventral bristle. A muscle terminates at base of exopod bristle.

Sixth limb (Fig. 6A): Epipod with 3 groups of 5, 5, and 6 (dorsal) long plumose bristles; dorsal group with additional short 7th bristle (Fig. 6A). Coxa with 1 spinous,

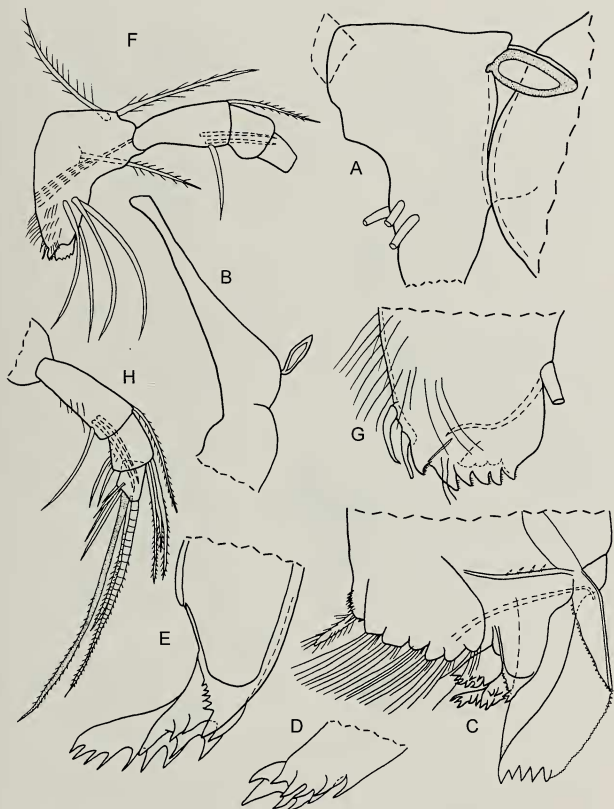


Fig. 4. *Bathyconchoecia omega* holotype, MCZ 50432, A-1 male: A, Left mandible, junction of coxa and basis, lateral view. B-H, Right mandible, lateral views: B, Proximal part of coxa; C, Distal end of coxa; D, Detail of proximal tooth of coxa (detail from C); E, Detail of distal tooth of coxa (detail from C); F, Basis and endopod; G, Distal end of basis; H, Endopod.

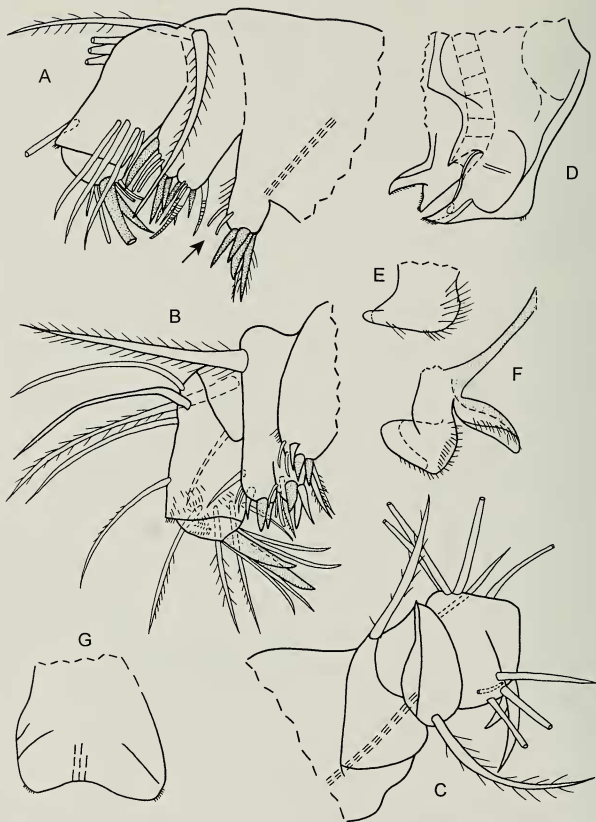


Fig. 5. *Bathyconchoecia omega* holotype, MCZ 50432, A-1 male: A, Right maxilla, medial view (arrow indicates tube-formed bristles); B, Left maxilla, lateral view; C, Right maxilla, oblique dorsal view (not all bristles shown); D, Anterior of body from right side showing upper and lower lips (esophagus dashed); E, F, Lower lip from left side, anterior of body to left; G, Upper lip, dorsal view.

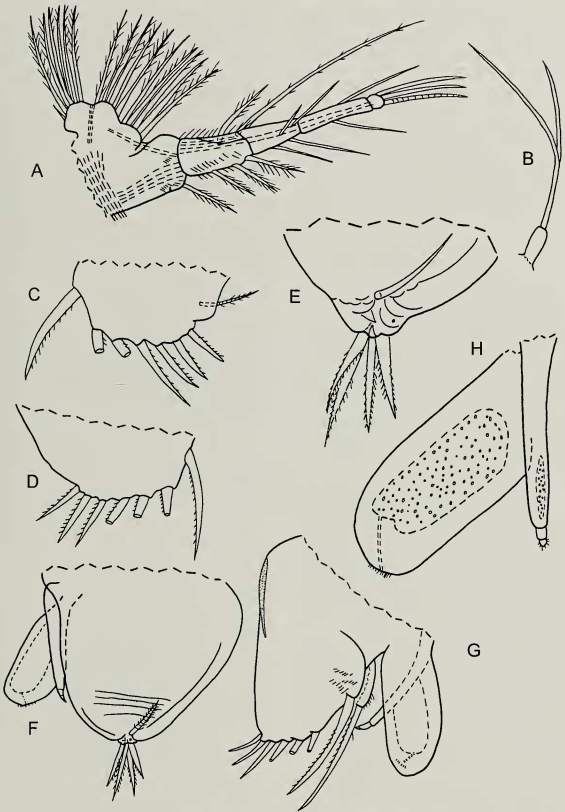


Fig. 6. *Bathyconchoecia omega* holotype, MCZ 50432, A-1 male: A, Right 6th limb, medial view; B, 7th limb; C, Left lamella of furca and unpaired bristle, lateral view; D, Right lamella of furca, lateral view; E, Posterior view of ventral end of body showing unpaired bristle and furca; F, Posterior view of body showing copulatory organ on left side; G, Posterior of body from right side showing furca and copulatory organ; H, Copulatory organ from left side, anterior to upper left.

ventral, terminal bristle. Basis with spines, 4 spinous bristles and 1 long, terminal, dorsal, exopod bristle with widely scattered minute spines (basis may consist of medial and lateral parts). Endopod: article 1 with 4 bristles; article 2 with 2 bristles; article 3 with 3 long terminal bristles (dorsal 2 claw-like). A muscle terminates at base of exopod bristle.

Seventh limb (Fig. 6B): Broad thumb-like process with 2 long unequal bare bristles.

Furca (Fig. 6C–G): Each lamella with 7 claws with teeth along posterior margins; 1 unpaired spinous bristle following claws on lamellae (Fig. 6E).

Bellonci organ: Not developed.

Lips (Fig. 5D–G): Upper lip with spinous posterior edge (Fig. 5D, G). Lower lip spinous (Fig. 5E, F).

Copulatory organ (Fig. 6F–H): Organ with 2 separate branches on left side of body. Broad anterior branch with minute terminal teeth; narrow posterior branch with small tapered tip.

Comparisons.—The length of the unique A-1 male from off Newfoundland (excluding spines) is 2.92 mm, whereas A-1 instars of *B. deeveyae* and *B. septemspinosa* are shorter than 1.8 mm (Kornicker and Angel, 1975: table 1; Kornicker, 1981:1240). A length of 0.66 mm was reported for an A-4 instar of *B. deeveyae* by Kornicker (1991: 30). The adult male of *B. longispinata* has a range of lengths of 1.95–2.11 mm (Ellis, 1987: Table II), much shorter than the 2.92 mm length of the A-1 male referred herein to *B. omega*. The 2 mid-dorsal spines on the carapace of the later specimen are shorter than those of *B. longispinata*. Also, the fossae and frills of *B. omega* are on all parts of the valve, whereas, they cover only certain areas on *B. longispinata*. The length of the adult male of *B. georgei*, new species, is 1.28 mm, much smaller than the length (2.92 mm) of the A-1 male of *B. omega*. The carapace of the former species is without the frills present on the carapace of *B. omega*.

The 2nd endopod articles of both mandibles of the A-1 instar of *B. omega* bear 5 bristles compared to 4 on the A-1 mandibles of *B. septemspinosa* and *B. deeveyae* and the adult male mandible of *B. longispinata*, and 3 on the adult male mandible of *B. georgei*. Mandibles of a total of six A-1 and A-2 instars of *B. septemspinosa* examined by Kornicker and Angel (1975: Table 1) indicate that the number of bristles on the 2nd endopod article of the mandible of those instars do not vary from 4 bristles and, therefore, may be a reliable character to use to discriminate specimens of *B. omega*, but reliability of the character in the latter species is unknown.

Bathyconchoecia georgei, new species

Bathyconchoecia deeveyae Kornicker.—George, 1971: 141, figs. 1–9.
Not *Bathyconchoecia deeveyae* Kornicker, 1969: 403, pl. 1, figs. 1–2.

Etymology.—Species named in honor of Jacob George, National Institute of Oceanography, Cochin-18, India, who described the specimen upon which the new species is based.

Holotype.—Unique specimen, adult male. Specimen is in a vial labeled 07.43, with serial number 0130, deposited in the archive room at the Indian Ocean Regional Centre, National Institute of Oceanography, Cochin – 14, India (there are no mounted slides). (Information about specimen supplied by Dr. Rosamma Stephen, Scientist, National Institute of Oceanography Regional Center, Cochin, in correspondence with the junior author. Dr. Stephen did not examine specimen in vial, but stated that she “could make out that there is a white specimen inside.”)

Type locality.—International Indian Ocean Expedition station Co. 62 (I. O. B. C.1969), in vertical haul from 200 to 0 m, off SW coast of India, 10°39'N, 75°22'E.

Material.—None examined.

Discussion of B. deeveyae Kornicker, 1969.—This species was described from an

A-1 juvenile collected at a depth of 508–523 m in a benthic trawl in the Peru-Chile Trench System, Pacific Ocean (Kornicker, 1969:403). A second specimen, an adult male, was collected in a vertical plankton haul from 200 to 0 m in the Indian Ocean off the SW coast of India (George, 1971: 141). A third specimen, an adult or A-1 female, was collected at a depth of 520 m in an epibenthic sled from off Surinam, Atlantic Ocean (Kornicker, 1981:118). Ellis (1987:83) observed, "It is possible that these three specimens are not conspecific." That observation prompted the present authors to reconsider the three specimens that had been referred to *B. deeveyae*, and led to our conclusion that the Indian Ocean specimen is not conspecific with the other two specimens of *B. deeveyae* from the Atlantic and Pacific Oceans. The Indian Ocean specimen was adequately described by George (1971: 141), so that only a brief diagnosis based on the adult male is presented here.

Diagnosis (adult male).—Carapace 1.28 mm long, excluding spines. Second endopod article of mandible with 3 bristles. Furca with 8 claws on each lamella.

Comparisons.—The carapace of the new species, *B. georgei* is much smaller than equivalent stages of *B. septemspinosa*, *B. deeveyae*, and *B. longispinata* (because only the adult male of *B. georgei* is known, the relative sizes of its instars is an extrapolation). The 2nd endopod article of the mandible of the adult male *B. georgei* bears 3 bristles compared to 5 on the adult male of *B. longispinata* and 4 on the A-1 instars of both *B. septemspinosa* and *B. deeveyae*. The adult male *B. georgei* bears 8 claws on each lamella compared to 7 on the adult male *B. longispinata*.

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